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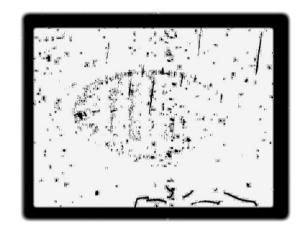
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CONTRACT NObsr-57200

FILM

DIELECTRIC CAPACITORS

Quarterly Report

Copy #4.

TOBE DEUTSCHMANN CORPORATION .

Quarterly Development Report

DEVELOPMENT OF-

FILM DIELECTRIC CAPACITORS --- HIGH TEMPERATURE

- 0 -

This report covers the period January l, 1954 ... to April 1, 1954

TOBE DEUTSCHMANN CORPORATION

921 Providence Highway Norwood, Massachusetts

NAVY DEPARTMENT BUREAU OF SHIPS --- ELECTRONICS DIVISION

C'assification cancelled in accordance with E) ecutive Order 10501 issued 5 November 1953

Document Service Center Armed Services Tech. Into Agency

Contract No. NObsr-57200

Index No. NE-111016, St. 1

Date of Contract: Feb. 20, 1952

Date of Report: Apr. 15, 1954

C M P Classification Class "A" Product

Certification DO-A-7 certified under CMP Regulation No. 3

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ABSTRACT

PHASE I

All the data gathered on Mylar C Capacitors operated at 125°C. has been analyzed and the results presented in the form of a curve showing the percent of failures to be expected in a 72-hour period in Mylar Capacitors at various stresses.

This curve indicates that these Mylar capacitors can be operated at a stress of 700 volts per mil, at 125° C_{cc} and operated for a minimum of 72 hours without exceeding a 3% loss in the test group.

The data gathered at other temperatures is now being analyzed to provide a similar curve for these temperatures.

Indications are that 125° C. may be the top limit, with the present grade of Mylar, except for extremely short-term operations.

Tests to determine this top limit are new anderway.

BULLET BUTTON

R.E.S.D. LOVI.E.D

R-E-S-P-R-1-C-7-E-D

ABSTRACT

PHASE II

All the tests during the last quarter on Metallized Mylar bave been run to determine the quality of various methods of making contact to the metal film so as to eliminate opens during life test.

The quality of Metallized Mylar capacitors from the point of view of dielectric strength has been proven, and the stress at which these capacitors can operate has been determined.

There remains only the problem of solving the large amount of opens occurring in Life Test.

Two methods are showing good results:

- Making a small fold in the edge of the dielectric during winding so as to provide a greater area of metallizing to the contact rather than an edge a few microns in thickness.
- Increasing the margin by a 32nd of an inch, and melting down this margin with a heavy penetrating spray of metal.

Although the results obtained thus far are based on only three groups of capacitors, the results are extremely encouraging.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-LO-N



Part I.

PURPOSE

A. Develop Film Dielectric Capacitors, high-temperature, utilizing DuPont "Mylar" Film (V-200) or equivalent, as a capacitor dielectric, in order to achieve higher temperature operation and greater reliability of fixed paper capacitors, in accordance with Eureau of Ships Contract Specification SHIPS F-400, dated 15 September 1951, as follows:

B. Phase I.

- Evaluate a V-200 film or equivalent in accordance with paragraph 3.2.1 of referenced Bureau of Ships Contract Specification SHIPS F-498.
- Furnish fifty (50) each of various capacitors as described in paragraph 3. 2.1 of referenced Bureau of Ships Contract Specification SHIPS F-498.
- 3. Submit reports as specified therein.

C. Phase II

- Evaluate a V-200 film or equivalent with metallized electrodes in accordance with paragraph 3, 2, 2 of referenced Bureau of Ships Contract Specification SHIPS F-499.
- Furnish fifty (50) each of various capacitors as described in paragraph 3, 2.1 of referenced Bureau of Ships Contract Specification SHIPS F-499.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

PURPOSE (continued)

- 3. Furnish one (1) set of Type D. Class IV Manufacturing
 Drawings in accordance with Bureau of Ships Specification 16 D19 (RE), dated 15 January 1946, and Amendment
 No. 2 dated 1 May 1948.
- 4. Submit reports as specified herein.

GENERAL FACTUAL DATA

PHASE I

It was discovered during Life Tests that Mylar Capacitors tested at 125°C. draw more current than was normally anticipated. To further investigate this phenomenon a series of tests were performed using 1 Mfd. capacitors constructed with two .0005" films of Mylar C between foils.

One test was performed with individual units and another with several units in parallel.

The results in both cases were uniform enough to be incorporated into Curve #C-1017 shown in Part III P. 10-A.

The tests in all instances were performed in the following manner:
The units were placed in an oven at 125° C. and allowed sufficient
time to stabilize to that temperature. With leads passed through the
oven wall to external instruments, the voltage stress was increased
in 100 V.D.C. increments to a maximum of 1200 V.D.C. It was
found that beyond that stress point, units of such construction break
down too rapidly to assure reliable results. At each applied stress
voltage, the current was measured in micro amperes. These values
were subsequently converted to megohms, and plotted as Insulation
Resistance vs. Voltage Stress at 125° C.

S-E-C-U-R-I-T-Y I-N-F-

I-N-F-O-P- M-A-T-I-O-N

GENERAL FACTUAL DATA (continued)

PHASE I

An analysis of this curve makes it very obvious that Mylar C at 125° C. possesses undesirable characteristics.

At 100 V. D. C., which is the approximate potential applied for insulation resistance measurements, the result is only 22 megohms per microfarad, and the curve slopes steeply so at 1200 V. D. C. the result is a mere 1.5 Megohms per microfarad.

This sharp decline is surprising since paper changes insignificantly with voltage stress.

At any rate, these results do not coincide with the early history of the material. Our first curves showed 400 megohms per microfarad at a potential of 90 V. D. C. It might be that Mylar deteriorates when stored for any length of time, or it may be that one lot of material varies that much from another. In either case, it is an undesirable characteristic.

Characteristic "K", taken from the MIL-C-25A Specification, allows a minimum insulation resistance value of 10 megohms per microfarad at 125 °C. Judged on this performance, Mylar C hardly exceeds paper as a dielectric at elevated temperatures.

GENERAL FACTUAL DATA

PHASE II

As mentioned previously, the excessive number of opens that occur during Life Test has been the greatest difficulty encountered with Metallized Mylar.

The bond between the pigtail or terminal connection to the Metallized film on the Mylar has in most cases ruptured during the Life Test. Basing our research on the theory that the heat evolved during the end spray of copper and solder is sufficient to fuse away a fraction of the protective Mylar margin, we have increased this margin from 1/16" to 3/32".

The units referred to in this report were all wound with material having a 3/32" margin.

As a second remedy to this situation, an installation was made on the winding machine whereby a 1/64th of the outer edge of the Mylar was rolled over just previous to being wound.

The capacitors made in this manner have not as yet been exposed to Life Tests and cannot be reported on at this time.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

D-E-T-A-I-L F-A-C-T-U-A-L D-A-T-A

PHASE I

Work continued, as scheduled, with the 1 Mfd. Capacitor constructed with two layers of .0005" Mylar C film between foils.

The test temperature was 125° C., and the applied Life Test voltages ranged between 600 V.D.C. and 1000 V.D.C. The units were wound with Mylar taken from the same lots as those previously tested and the gauge of the material varied similarly between .00048" and .0006". The winding specification and techniques were the same as those used previously for this type unit.

- A. Seventy-five units were divided into three groups of twenty-five each:
 - Tested at 600 V, D.C., two units failed voltage
 test prior to Life Test. Both were mechanical
 failures. The remaining twenty-three units were
 placed on Life Test, and twenty-one completed
 72 hours. Both failures were caused by Mylar
 faults. (See Part III, P. 1.)
 - 2. Tested at 800 V. D. C., three units failed voltage tests prior to Life Test. All three were mechanical failures. The remaining twenty-two units were placed on Life Test and thirteen completed 75 hours. There were eight Mylar failures and one mechanical. (See Part III, P. 2)

DETAIL FACTUAL DATA

Phase I (continued)

3. Tested at 1000 V. D. C., two units failed voltage test prior to Life Test. One was a Mylar failure, the other a mechanical. The remaining twentythree units were placed on Life Test, and eight completed 72 hours.

There were fourteen Mylar failures and one mechanical. (See Part II, P. 3.)

- B. Seventy-five units were divided into three groups of twenty-five each:
 - Tested at 600 V. D. C., one unit failed voltage test prior to Life Test. It was a mechanical failure.

The remaining twenty-four units were placed on

Life Test and twenty-one completed 72 hours.

There were two Mylar failures and one mechanical.

(See Part III, P. 4.)

2. Tested at 800 V. D. C., two units failed voltage test prior to Life Test. Both were mechanical failures. The remaining twenty-three were placed on Life Test, and seventeen completed 72 hours. There were four Mylar failures and two mechanical.
(See Part III, P. 5.)

DETAIL FACTUAL DATA

PHASE I (continued)

- 3. Tested at 1000 V, D. C., three units failed voltage test prior to Life Test. Two were mechanical failures and one a Mylar failure. The remaining twenty-two units were placed on Life Test. and eleven completed 80 hours. There were ten Mylar failures and one mechanical. (See Part III, p. 6.)
- C. Seventy-five units were divided into three groups of twenty-five each.
 - Tested at 700 V. D. C., all units passed the tests
 prior to Life Test, and twenty-two completed
 88 hours. There were two Mylar failures and one
 mechanical. (See Part III, P. 7.)
 - 2. Tested at 800 V. D. C., all units passed the tests prior to Life Test. All twenty-five units were placed on Life Test and thirteen completed 74 hours. All twelve failures were caused by Mylar faults. (See Part III., P. 8.)
 - 3. Tested at 900 V. D. C., all units passed the tests prior to Life Test. All twenty-five units were placed on Life Test and seven completed 76 hours. All eighteen failures were caused by Mylar faults. (See Part III, P. 9.)

DETAIL FACTUAL DATA

PHASE II

The tests were performed at 125° C. using the .25 Mfd. capacitors, constructed with a single layer of .0005" Metallized Mylar C as the dielectric. The margins, however, were increased from 1/16" to 3/32".

- A. Seventy-five units were divided into three groups of twenty-five each:
 - 1. Tested at 300 V. D. C. all units passed the tests prior to Life Test. All twenty-five units were placed on Life Test and twenty-five completed 260 hours. (See Part III, PP. 12, 13, 14.)
 - 2. Tested at 400 V. D. C., all units passed the tests prior to Life Test. All twenty-five units were placed on Life Test and twenty-five completed 260 hours. (See Part III, pp. 15, 16, 17.)
 - Tested at 500 V. D.C., one unit opened during the initial voltage test. The remaining twenty-four units were placed on Life Test and twenty-four completed 257 hours. (See Part III, pp. 18, 19, 20.)

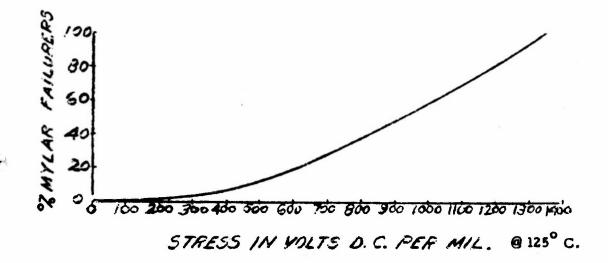
S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T R-I-C-T E-D

CONCLUSIONS

PHASE I

By compiling the results of all the Life Tests conducted at 125°C. (See Part III, P. 10) with the 1 Mfd. Capacitor, constructed with two layers of .0005" Mylar C between foils, it was possible to plot the curve below:



a) The Curve is derived from plotting the average number of failures in 72 hours of each test voltage group.

A correction was made from the test data to derive the voltage necessary to cause 100% failures in 72 hours. If the test data were plotted directly, that point would be 1500 VDC, but since 100% failures occurred at that voltage in only 41 hours test time, by calculation, it was found that 1360 VDC should be used.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

CONCLUSIONS (continued)

PHASE I

It is our conclusion that a 1 Mfd. capacitor constructed with two layers of .0005" Mylar C between foils will operate for a minimum of 72 hours at a stress of 700 VDC, and at a temperature of 125° C. without exceeding a loss of 30% of the test group.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

CONCLUSIONS

PHASE II

With only the results of three groups of test units as a basis, we cannot conclude that the matter of "opens" among Metallized Mylar C units has been solved, but the indications are very encouraging.

Of seventy-five units tested, only one "open" occurred, and that happened before Life Test.

Very rarely, in our previous Life Tests, even at the lower test temperature of 85°C, have any units completed Life Test without any "opens."

These results were gained with test units wound with the margins increased from 1/16" to 3/32". Further tests with similar material will settle this issue.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

PART

PROGRAM FOR NEXT INTERVAL

PROGRAM FOR NEXT INTERVAL

PHASE I

Sufficient test data has been compiled with the 1 Mfd. Capacitor constructed with two layers of .0005" Mylar C between foils at 125° C.

The program for the next quarter will center on units of similar construction, but the test temperature will be raised to 150° C.

Basing our prognosis on the evidence we have found to date, mainly the poor Insulation Resistance of Mylar Capacitors at elevated temperatures, we believe that very few tests will be needed to show conclusively that Mylar C, as we have it on hand, will not serve effectively as a dielectric at 150 °C.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N R-E-S-T-R-I-C-T-E-D

PROGRAM FOR NEXT INTERVAL PHASE II

It is our intent to continue the work with Metallized

Mylar C Capacitors, with both increased margins and
rolled over edges until it is determined which method
yields fewer "opens". If neither of these methods
improves the condition, other means will be tried until
a satisfactory solution is reached.

It is meaningless to continue testing units which fail mechanically before the stress point of the Mylar C is reached.

S-E-C-U-R-L-T-Y I-N-F-O-R-M-A-T-I-O-N R-E-S-T-R-I-C-T-E-D

PART III

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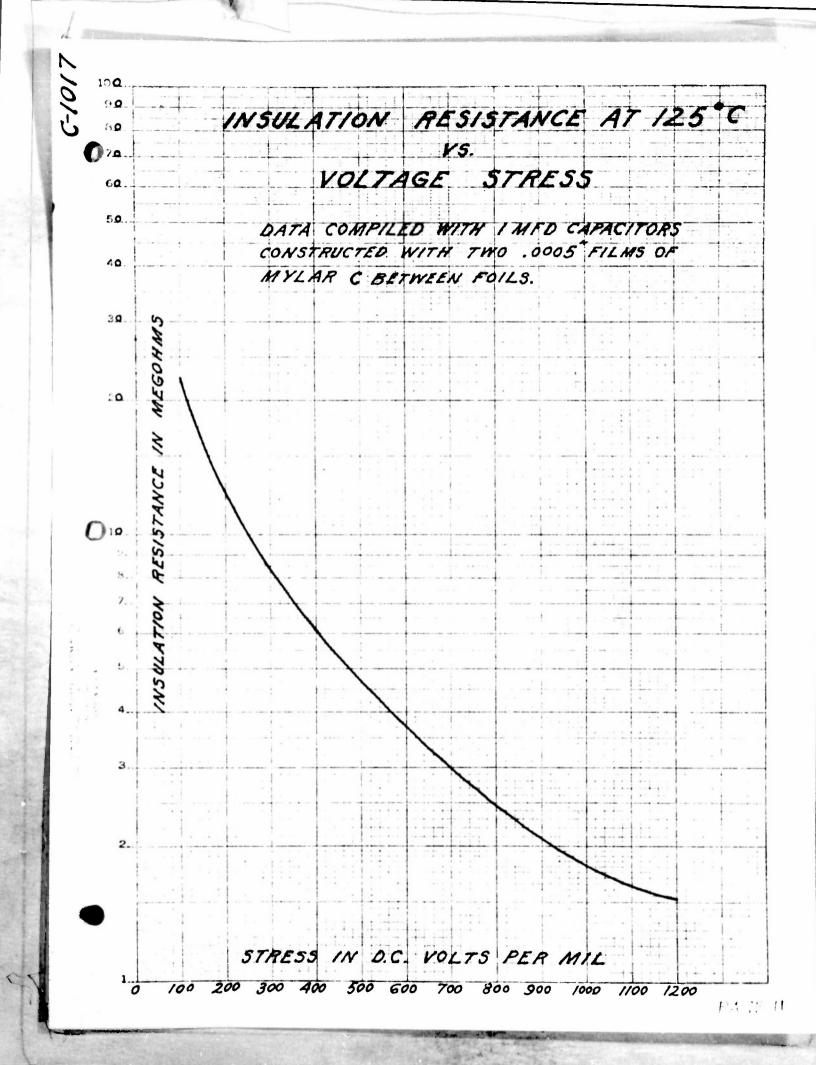
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Poler /	Voltage	Temperature	Mumber of Units	Pailed Before	Started On Edfe	Mechanical Failures	Mylar Failures	Mylar Failures	Lot	Margin	Number Open After Liffe
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PECIFICATION	EX	H	F	EUT	AL			FOR	FOR WHOM	>	*	-	IN ROT	H		CON	CONTRACT NO.	9	NO	Nobsr		57200	00	
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Sample Number	1	2	3	7	5	9	2	80	6	10 1	11	12	13 1	14 1	15 16	-	17	18 1	19 2	20 21	- 2	22 23	え	
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Shart II-man Oat Kellant	FIRK	/WIKT //	* Jan/	W 13 /3	1901/	1901/	10011	150	100/	180 KT /	100 1 / 10 M		NO WE	with look links	00/ 140	F Aler		5.	16.5 / 2014 / 100 17 / 100 17	14/8	20	7/00/	4400/4	7 /m K
5/000/ phr	150	2801	324 2282	282	2334 ,2	100	2262,286	369.2296	98.	2.045	236.2	25	346.2	1236. 2364. 422. 4962. 2525. 2525.	\$62.2	1175	183.7	250	2545 JUN 2212 350F	08 . No	20,8900	233 - 25%	7, 2292	2.230
POWER FACTUR - %	5	-496 2.4B	-+	85	143	710	1,62	1	00	60	36	46,	100	1	ST 13	-0	138	3) .73	100	35,	.35	57.73	34.	355
>	3		1	7	1		+					+		++	1	1				1	1	1		
							1							+				1/	+.					
LIFE TEST FAILURES IN HRS.														, ~									T.	
	1-		1	1				ELE	ELECTRI CAL	11	TESTS	APTE	APTER LIFE	TEST E	T		1				1			
Sample Number	1	2	3	1	5	9	7 8		9 10	1	11	15	13 14		15 16		17 18	- 1	19 20	2	22	53	元	8
Short R- Dec O 755	/voi/	1001 1001 1001 100 11 100 11 100 11 100 11 11	/w// *	No.		San' A	16517 100 HT 100	1	104/1	/w/t//	/10 Kt 10	1 Po 11/10	1404/	/mrt /r	/m/#/m/	180 K* 10	10017 10017	N 1 1 N	/m ht / / / / / / / / / / / / / / / / / /	17 100 KT	1 /00 kt	17 18 17	T 18 KT	Hall
8/0 m/ 8/ 11 da		235 . 2533 . 243 A322	503	322.2	2257 3	2.845.2	2278.23	35	2836.23	2. 9202,	22.7.2	2317.5	286.2	226929	2378 23	736/ 33	2302	25 185	2297 23	1328.1301	01.235%	77.78	12313	28
Bust FALTOR - 1/8	.405	.405 >6.0 .74		0	'0'	·	14. 54.		1,07	48	19	525	80	39 .6	. 69	7.9	47 .	39 .75	5 .72	2 .45	1.48	**	309.	14.
				-				+	H	+		1		H		1								
Turely net Eur										+								-						
- 12		1				-	-	1		+ .	A	8	Date collected	ed by	7	0	Benga	1	V. K. L.)	3				
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NObsr M#44

Twenty-five .25 Mfd. Single .5 Mil Metallized Mylar C Units

Test Completed

The units (25) were wired to a Life Test rack after the initial tests were concluded, and the total capacitance measured at room temperature. Following this, they were heated in an oven to 125° C. for one-half hour. The capacitance was then measured at 125° C.

Next, the units were exposed to 300 V.D.C. pre-breakdown test for one-half hour. During this period, there were ten temporary breakdowns. The capacitance was again measured before the Life Test commenced.

Total Capacitance	Elapsed Time
6.4 Mfd.	Start of Test
6.4 "	24 hours
6.4 "	45 ''
6.4 "	68 ''
6.4 "	93 "
6.1 "	116 ''
6.1 "	18 3 "
6.1 "	212 ''
5.9 "	241 "
5.9 "	260 ''
	Capacitance 6.4 Mfd. 6.4 " 6.4 " 6.4 " 6.4 " 6.1 " 6.1 " 6.1 " 5.9 "

NObsr M#44 (Continued)

Number	of units st	tarted o	n tes	t	• • • •	• • • •	• • • • •	• • •	25	
Number	finished	• • • • •		• • • •		• • • • •			25	
Total C	apacitance	before	Life	Test	at r	oom	tempe	ratu	re5.75	Mfd.
11	ti	11	n	11	fi	125°	°c.	• • •	6 . 6 5	, "
Number	r of perman	nent fai	lures	• • • •	• • • •	• • • •	• • • • •		0	
Number	r of tempor	ary fai	lures	• • • •	• • • •	• • • •	• • • • •	•••	1 4	
Number	r of opens a	t the e	nd of	the to	est .			.,.	0	

יוש לוו ביי	4	- (BESSEL ST			LITE	1 12	TEST RECORD	CORD							8	1	90	10º 10. 40ber 114 4	•	
SPECIFICATION E	EXP	PERIN	LINERT		411			FOR WHEN	A J BE	V. H. V	VINRAI VA 5°C	FOR WENT V. H. W. IN PAIN.		CONTRACT	CONTRACT	STATE OF THE PARTY	9	400	Wobse-	Sr - 57	57200		1
	7 7 7	\$24 PRINCE -	Clock	4	44	4482		e 2	Date finished	D Fm. 0 - 54	- 2		Clock	4.2	11	4692		٤		Hours	1	09	
S 34		L.					ETE -	ELECTRICAL		ESTS.	TESTS. BEFORE	T LIFE	TE TEST	ST		-	1-						
Sample Number	1 2	3	д	5	9	2	100	6	2	11	12	13 14	1 15	2 16	17	18	3 19	8	ส	22	23	え	2
PLIAGE 4POVIDE	0																						N.
Mc , 0 77'F	/eo/ //oo/	100 K / OURT	T. About	(M)	/toot/	70007	/korl	100	200	Month 1	1212	100 1	W I'V	Met. In	MOHT IME	100 th	Trees.	r /mat	1/2.6	/60 11	1201	110 F	/mtc
1054) C	3	382.042.488	3261	. C1	1224	7780	9955	2275	925	24 20 20 20	100	250 23/6	-	3200, 3180	1 -1	2362, 2362	37.25.6		1082.7952	1.23/	2885.	1517	35/8
CONTRACTOR OF THE PARTY OF	32	0.00	18	25	7.	13.2	186	300	3.7	75,	56	1 16	tt. 148	17.		36 85	:37	375	1.19	38.	.37	30	76
	4 4						4.					1		- + -								7	
	- A		•																				
LIFE TEST FAILURES IN HRS.											100								of terrors				
		\parallel					ELE	BLECTRICAL		TESTS	AFFE	APTER LIFE	TEST 2	E4						1-54			
Sample Number	1 2	3	3	2	9	7	100	67	10	a	12	13 14	15	2 16	17	18	13	8	ผ	22	23	え	8
Short K- New Oak 90 HONE	7 00 K		8 8	7 /m K	1400/	/oct.	14.8	, T. T.	14 Kt	Park!	42	(P. 157 / P.	41.41	onkt /mkt	200	wat welt	r 1801	\$ /wht	1 /00 Kt	/00 K	15 S	4	1
Cap. 14 MED-1000 15. 2838. 2552	27 84	12.2329	Sec. 12	2516	12277	257/	.239	23.24.0	2287	2337.2	2312	23371.2	.2558 2939	37.28	8 2267	97.2822	2.2306	200.7	6 23 43	5 23(5	7387	187	1887
Pausa Factor - %	52. 475	25 : 79.	90	1,4	65	.43	29	1.48	38.	18.7	. 89	.33 2	2.0 .71.	1.42	11.	1.75	5.7	.52	.42	13.	.73	37	57
				-													,						
																							100
6.15							†			Date		collected	4 0	7	300	200		N . N	3				

NObsr M#45

Twenty-five, 25 Mfd.
Single. 5 Mil Metallized
Mylar C Units

The units (25) were wired to a Life Test rack after the initial tests were concluded, and the total capacitance measured at room temperature. Following this, they were heated in an oven to 125° C. for one-half hour. The capacitance was then measured at 125° C.

Next, the units were exposed to 400 V.D.C. pre-breakdown test for one-half hour. During this period, there were no breakdowns. The capacitance was again measured before the Life Test commenced.

Temporary Breakdowns	Total Capacitance	Elapsed Time
0	6.7 Mfd.	Start of Test
5	6.3 "	24 hours
179	6.2 "	45 "
186	6.2 "	68 "
186	6.2 "	93 ''
186	6.2 "	116 "
186	6.6 "	188 "
136	6.6 "	212 "
186	6.4 "	241 "
186	6.4 "	260 "

Test Completed

NObsr M#45 (continued)

Number	of units	started	on test	٠.,	• • • •	0 0 0 0 4		25		
Number	finished	• : • • •	• • • • • •	• • • •	• • • •	• • • •	0 0 9	25		
Total ca	pacitanc	e befor	e Life T	[esi	at ro	om te	empe	rature	5.80	Mfd.
••	**	•	11	"	11	125°	C.	• 0 0 0 0 0	6.70	Mfd.
***	11	after p	re-brea	kdov	vn te	st		¢ 0 ¢ 0 0 2 0 0	6.70	Mfd.
11	11	" :	Life Te	st			0000	• • • • • • •	6.40	Mfd
Number	of perm	anent f	ailures				0 4	0		
Number	of temp	orary f	ailures				18	36		
Number	of opens	at the	end of	the t	est.		e (;	0		

PECIFICATION EXPASSIMENTA							200000000		To Assess		2000				No. of Concession, Name of Street, or other		-	-			
	1	5 Mu	7		MET	ETALLIZED	CED	Ŕ	MYCAR	9	200	CAPACITOR	0.23		65 Table	5	. 46	18	LOT NO. NU BAR MANY	7	
	EU ZA	1			2	POR VEON		× :>	M	V. H. WINROTH	77		201	CONTRACT NO.		404	J	2760	00010		
nouse or frest	20				5	TEXPERATURE	URG		120	125°C				VOLTAGE		500	20 10 20	V. D &	1,1		
16- Day 16-54	Clock fray	(O)	es .	3305	4	Date finished	Diebed	0-54	4		Clock	61		3562		2	7	lours	257	23	
					ä	ELECTRICAL TESTS	1	ESTS	BEFORE	T IIFE	TEST TEST	ST				-					
Semple Bumber 1 2 3	4	5	9	7	100	6	2	77	12 1	13 14	1 . 15	5 16		18	8 19	8	2	22	23	龙	8
VALTAS & SEO 1192 P											-	4	0	P	\parallel	\parallel					6
105 No. 10 0 0 7/7 100 1/2 100 1/2 100 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2	189	78.87	73.5	/PUR	1/8/	142	E E	42.2	1 2 2	P. M. 180 H	1 1 1	/w K, /w	1885. D. J. A.	1877	18 / mk		lockt /mkt	10/2	100€	AN A	100
190 10 MED -1900 C/8 (22%) 23% -317	.235	7.82 W	3	25.5	3	2002	275	200	98	92.6	26	2328.226.22.97.2295	June 143	De sont	7.23	79 47 45	22.5	N227	Nec 8822 78 24 282 346 784.	उद्धर	182
Pares Factor - 12 .71 .71 .7	r	.57	1	(0)	3	50	1/2	50	S	35	9	1	27.0	A Hom	7 1.0	29. 20	7.73	.35	3.5	1,7	.39
									++				D"+	1 - 10					. (.		
													4	কল্প	-						
LIFE TEST FAILURES IN HRS.								1.0		1 .		•	8	013				/		A 44	
					12	ELECTRI CAL	11	TESTS	AFTER	A LIPE	rest	E+						1 1			
Sample Rumber 1 2 3	3	2	9	2	80	6	9	7	127	13 14	15	2 16	-	17 18	57	8	2	2	23	龙	8
Shunt R-NES D 78" Floor" 1001" 1001"	/apir.	/3 R.) S	/3 ET	/80 h.	/ (30 LL ₂)	19 14	7-81	12 14 11	19 19	1/ 1/20/	1984 /20	1/80	18	100 K 100 K	£ €	18 1	10 14 10 18	2	1	E
Cap. 14 HFD - 1000 96 . 2924. 2967 2208.		234 2402 2539 2552 2359,2304 . 227	2539	23.62	23%	2304		1332,2871	-	352.2	265.23	23,27. 7365.2304.272	1	7367	11.62.43	25	2342 - 2262	777	3862	236	a
48 FACTOR- % . 49 . 48 . 44	.15	.55	17	77	7	48	315.	11.	29	765	25.7	307.765 708	4-4-	**	7.7	.53	7.7	153	.58	3	
1														- J							
								- A	翻Ы	allect		7	E								
					1	1	3	8	1	9				2							

NObsr M#46

Twenty-five . 25 Mfd. Single . 5 Mil Metallized Mylar C Units

The units (24) were wired to a Life Test rack after the initial tests were concluded, and the total capacitance measured at room temperature. Following this, they were heated in an oven to 125° C. for one-half hour. The capacitance was then measured at 125° C.

Next, the units were exposed to 500 V. D. C. pre-breakdown test for one-half hour. During this period, there were 39 temporary breakdowns. The capacitance was again measured before the Life Test commenced.

Temporary Breakdowns	Total Capacitors	Elapsed Time
0	6.4 Mfd.	Start of Test
58	6.3 "	24 hours
166	6.15 "	42 "
166	6.15 "	65 "
166	6.15 "	90 ''
166	6.15 "	11 3 "
167	6.20 "	185 "
171	6.20 "	209 "
171	6.15 "	238 "
171	6.15 "	257 ''
		Test completed

NObsr #46 (continued)

Number	of unit	ts star	rted o	n tes	t	• • • •		• •		24				
Number	finish	ed		• • • •		• • • •			• •	24				
Total car	pacita	nce be	fore	Life '	Test	at r	com	ter	npe	ratu	re,	• • •	5,55	Mfd.
11	17		**	11	11	11	12	.5°	C,	, , ,	0 0 0 2		6.40	Mfd.
u	**	after	pre-l	oreak	dow	tes	st	• • •			u • • •	o •	6.40	Mfd.
14	11	**	Life	Test	0 0 0 5			• • •	0 (0	,	• • •	• • c	6.15	Mfd.
Number	of per	mane	n t fa il	ures	• •			• • •	• • • •	0				
Number	of ten	nporar	y fail	lures	^ • • :			•••	• • •	171				
Number	of ope	ns at	the en	nd of	the t	est				0				

S-E-C-U-R-I-T-Y LN-F-O-R-M-A-T-LO-N

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